



NUCLEAR REGULATORY COMMISSION

[NRC-2023-0067]

Modern Approaches for Radiological Measurement, Data Collection, and Data

Analysis of Surface and Subsurface Residual Radioactivity to Support

NRC License Termination

AGENCY: Nuclear Regulatory Commission.

ACTION: Request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is requesting information aimed at understanding the current state-of-art in approaches to radiological survey (i.e., radiation instrumentation and data collection) to support decommissioning and license termination.

DATES: Submit comments by **[INSERT DATE 30 DAYS AFTER PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received on or before this date.

ADDRESSES: You may submit comments by any of the following methods; however, the NRC encourages electronic comment submission through the **Federal rulemaking website**:

- **Federal rulemaking website:** Go to <https://www.regulations.gov> and search for Docket ID **NRC-2023-0067**. Address questions about Docket IDs in Regulations.gov to Stacy Schumann; telephone: 301-415-0624; email: Stacy.Schumann@nrc.gov. For technical questions, contact the individual listed in the "For Further Information Contact" section of this document.

- **Mail comments to:** Office of Administration, Mail Stop: TWFN-7-A60M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Program Management, Announcements and Editing Staff.

For additional direction on obtaining information and submitting comments, see “Obtaining Information and Submitting Comments” in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: Cynthia Barr, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone: 301-415-4015; email: Cynthia.Barr@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID **NRC-2023-0067** when contacting the NRC about the availability of information for this action. You may obtain publicly available information related to this action by any of the following methods:

- **Federal Rulemaking Website:** Go to <https://www.regulations.gov> and search for Docket ID **NRC-2023-0067**.

- **NRC’s Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly available documents online in the ADAMS Public Documents collection at <https://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by email to PDR.Resource@nrc.gov. The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in this document.

- **NRC’s PDR:** You may examine and purchase copies of public documents, by appointment, at the NRC’s PDR, Room P1 B35, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time (ET), Monday through Friday, except Federal holidays.

B. Submitting Comments

The NRC encourages electronic comment submission through the **Federal rulemaking website** (<https://www.regulations.gov>). Please include Docket ID **NRC-2023-0067** in your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at <https://www.regulations.gov> as well as enter the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

II. Discussion

The NRC is evaluating its readiness to evaluate new forms of data being submitted by licensees to demonstrate compliance with license termination rule (LTR) criteria promulgated in subpart E of part 20 of title 10 of the *Code of Federal Regulations* (10 CFR). Owing to significant technological advancements over the past two decades, NRC licensees have increasingly used, or plan to use, more modern and updated survey instrumentation and data capture tools, including use of global positioning system, light detection and ranging, and geographic information system technologies.¹ Data capture

¹ Note the conventional approach for radiological surveys includes a surveyor listening to the audible output of a radiation detector and pausing to count longer upon hearing an increase in counts as described in NUREG-1507, Revision 1, "Minimum Detectable Concentrations with Typical Radiation Survey for Instruments for Various Contaminants and Field Conditions" (ADAMS Accession No. ML20233A507) and NUREG/CR-6364, "Human Performance in Radiological Survey Scanning." Use of more modern systems with continuous data logging and without a surveyor listening to the audible output is increasingly being used. While NUREG-1507, Revision 1, provides some guidance on post-processing of continuously collected data in Chapter 6, Sections 6.3 through 6.5, additional guidance is needed on how to calculate *a priori* scan minimum detectable concentrations, as well as acceptable approaches for post-processing of the data.

technologies are used to record detector response, the date and time of measurements, and the location (i.e., coordinates) of each measurement. Newer scanning radiation survey instruments and mobile systems represent attractive options for radiological assessment that can be used by NRC licensees. In addition to radiological surveys being performed with a human surveyor using a backpack to hold instrumentation while scanning at a constant speed, various platforms and delivery methods have also been used to perform radiological surveys including autonomous or semi-autonomous air and ground vehicles (e.g., all-terrain vehicles, push carts, remote controlled ground vehicles, and drones).

Comments received on draft NUREG-1575, Revision 2, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM) (ADAMS Accession No. ML21008A573), indicated the need for development of statistical and uncertainty methodologies appropriate for these sorts of modern detection systems with data logging. Other comments received on draft MARSSIM, Revision 2, included the need for additional guidance on the use of radiation data mapping generated by continuous data-logging systems.

Because MARSSIM only addresses radiological surveys for surface residual radioactivity, additional guidance is also needed on surveys of radiologically contaminated subsurface materials. The MARSSIM methodology relies heavily on scan surveys to evaluate the presence of elevated areas between discrete sample locations. Subsurface soils cannot be effectively scanned due to attenuation of residual radioactivity in the soil column and, therefore, scanning is only effective for surface or excavated materials. Thus, NRC licensees could benefit from additional information regarding acceptable methods for collecting and analyzing data in the subsurface to support decommissioning sites and license termination. Proposed NRC guidance topics include approaches to optimizing subsurface survey design given access difficulties and costly sampling, and data analysis methods to support remedial and compliance decision-making.

III. Specific Request for Comment

The NRC requests comments from stakeholders, including nuclear licensees, professional organizations, nuclear industry consultants, vendors, academic researchers, and interested individuals. The focus of this request is to obtain responses aimed at gathering information that will permit the NRC staff to better understand trends in radiological survey instrumentation development and data analysis approaches, including those for survey of both surface and subsurface residual radioactivity.

IV. Requested Information and Comments

Additional guidance is needed to provide NRC licensees with increased transparency on acceptable approaches to collection and analysis of data collected using more modern data logging systems and associated instrumentation. Additionally, guidance is needed on acceptable approaches for radiological survey of subsurface residual radioactivity to demonstrate compliance with radiological criteria for license termination.

The NRC requests responses to a set of general questions. The following questions are focused on providing the NRC with an understanding of the state-of-art in approaches used to collect and process radiological survey and other data (surface and subsurface) to support decommissioning and license termination. Responses to these questions are expected to assist the NRC with obtaining information that it needs to develop guidance in the areas of (i) design and analysis of continuously collected radiological survey data without a surveyor listening to the audible output, and (ii) subsurface survey design optimization and data analysis to support decommissioning decision-making. Respondents can respond to any subset of the questions posed (i.e., responses do not need to address every question). Please consider providing information to allow NRC staff to contact organizations or individuals directly to clarify submitted responses.

Note: When answering these questions, consider providing details on when multiple systems are used for redundancy and/or variety and how that influences your response.

Questions Related to Continuously Collected Data Surveys without a Surveyor

Listening to the Audible Output

1. What types of system(s) or equipment (i.e., instrumentation, including radiation detectors, and software) do you use or plan to use to record radiation detector location and raw instrument response?
2. What methods do you use to calculate scan minimum detectable concentrations to ensure sufficient sensitivity to detect risk-significant levels of residual radioactivity or to better understand measurement uncertainty?
3. What methods have you used to post-process data to identify areas for follow-up investigation (e.g., use of radiation surveys maps, and statistical tests and measures to identify anomalous radioactivity to be targeted for follow-up investigation)?
4. Have you experienced technical issues with data collection and analysis during previous surveys and what methods did you use to troubleshoot those issues? Do you have any lessons learned you could share related to the technical issues?
5. What areas do you see as challenges or gaps to radiological survey design and data analysis that could be addressed in future guidance (e.g., *a priori* scan minimum detectable concentrations calculation) or tool development (e.g., data integration and post-processing)?

Questions Related to Subsurface Survey Design and Data Analysis

6. What types of instrumentation and approaches do you use to collect subsurface radiological survey data in the field? Specifically, what types of instrumentation and approaches has your organization used to perform surveys of hard to access locations in the subsurface (embedded piping, sumps, soils located at depth or underneath buildings, and bedrock)?
7. What types of methods and software (e.g., geophysical methods and related software) have been used and subsurface data (e.g., hard and soft data) have been collected, and what novel approaches have been used to combine or condition data to

develop site conceptual models or mathematical models, or to show release criteria have been met?

8. What statistical approaches have you used to show subsurface residual radioactivity meets release standards including consideration of uncertainty (e.g., number and depth of samples, type of data and statistical approaches used to demonstrate compliance)?

9. What approaches have you used to optimize subsurface survey designs including initial scoping to final status survey designs (e.g., geometrical or geostatistical techniques)?

10. What areas do you see as challenges or gaps with respect to subsurface surveys and data analysis that could be addressed in future guidance or tool development?

Dated: May 1, 2023.

For the Nuclear Regulatory Commission.

Christopher A. McKenney,
Chief, Risk and Technical Analysis Branch,
Division of Decommissioning, Uranium Recovery and Waste Programs,
Office of Nuclear Material Safety and Safeguards.

[FR Doc. 2023-09513 Filed: 5/3/2023 8:45 am; Publication Date: 5/4/2023]